

O X O C H E M   E N T E R P R I S E

PENUELAS

PUERTO RICO

TRAINING MANUAL

MODULE # 33

WASTE WATER DISPOSAL

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# WASTE WATER DISPOSAL SYSTEM

## TRAINING MANUAL

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WASTE DISPOSAL SYSTEM

1.0 Abstract

In other modules different sections of the plant has been studied in detail. The contaminated streams that are produced in several of these sections were discussed. This module covers the system that dispose of those contaminated streams.

The Waste Disposal System is a distributed system. That is, it is not concentrated in one specific area. The system only deals with waste liquid streams.

The main emphasis is in the collection system of the polluted streams however, the function of the disposal of waste streams is given some attention.

The intent of this module is to equip the learner with what he needs to know about the Waste Disposal System.

## 2.0 Objectives

Following is a list of objectives which the learner will be able to do after the completion of this module:

1. Draw a block diagram on demand without reference to notes of the Waste Disposal System, showing the inputs and outputs.
2. State when asked the origin of the contaminated streams.
3. List the equipment involved in this system.
4. Identify the equipment in the field and describe how it operates.
5. State when asked what control system are used.
6. Describe how the system does what it is supposed to do.
7. Draw a flow diagram with all the equipment.

### 3.0 Importance of Objectives

The basic information that you will learn in this module will give you the background you will need to trouble shoot the waste disposal system. Being able to sketch the system with all the equipment and describe their operation is sure evidence that you do have the required background and have the information needed to trouble shoot at your finger tips.

If you can use that information to analyze problems on paper, then you have demonstrated that you will be able to do a good job of trouble shooting the waste disposal system. Unless you visualize the system, see it in your mind's eye, the chances are you won't be able to trouble shoot it.

Take another look at the objectives. You will see that the importance of the objectives is that they prepare you to trouble shoot the system.

#### 4.0 Opening Remarks

Protecting the environment is the most popular cause of our days. We can safely say that if we have an Earth Day (organized demonstration to protest the degradation of the environment) in Ponce, Oxochem will not be one of the causes.

Aware of the environmental degradation caused by chemical and petrochemical plants, Oxochem has installed in the plant, facilities to dispose of the polluted liquid streams in accordance with the applicable laws in Puerto Rico. Today we are going to study these facilities.

5.0 Supporting Materials

1. The Overview Module which covers the Utility Section.
2. Overhead Projector.
3. Transparencies of the Sketches
4. The Operating Procedure for this System.
5. The Standard Operating Procedures.

6.0 Assumptions

To cover this module allow a minimum of one day to properly prepared learner. To be considered properly prepared, the learner should have completed the Overview Module. In addition he should have completed the training in Standard Operating Procedures. He should be familiar with control loops i.e. flow loop, level loop, etc. It would be helpful if he has the basis of trouble shooting practices.



## 7.0 What to Expect

We will spend part of the day, three or four hours, studying the content of this module. You will be asked to do each of the objectives as we cover them.

We will spend part of the day, two or three hours, visiting this Unit. During this period you will be asked to locate each of the equipment, to locate and sketch the controls, to trace the flows, to locate sample points, etc.

We will, at the end of the day, work together answering some quiz questions and reviewing.

The purpose of this study is to learn as much as possible about the Waste Disposal System. After this training module is completed we expect you to be able to do all the objectives for this module.

8.1 What this system does (See Fig.33-1)

Basically this system does two things, a) collects all the contaminated liquid streams produced in the plant and b) transfer this combined waste stream to Corco's Central Collection facilities.

The contaminated liquid streams are:

- 1- Excess water from carbon recovery system.
- 2- Butyrate waste stream from section 1000.
- 3- Spent caustic from section 600.
- 4- Excess contaminated condensate from section 400.
- 5- Oily water from pumps, compressors and vessels throughout the plant.
- 6- First 10 minutes of rainfall from storm sewer.
- 7- Contaminated waters from boilers and waste heat boilers.

## 8.2 How it does what it is supposed to do

The butyrate waste stream from section 1000, the spent caustic from section 600 and the excess contaminated condensate from section 400 are combined and fed to the Butyrate Scrubber V-1235 in Area 500. From the scrubber this combined stream is pumped to the transfer line which will deliver to Corco's Central Collection Tank in the Guayanilla Bay.

The excess water from the carbon recovery system is pumped directly from the unit to the transfer line which will take it to Corco's Central Collection Tank. In the future if this water is proven to be suitable for boiler feed water it will be diverted to the Dearator.

Oily water from pumps, compressors and vessels and the contaminated water from the boilers and waste heat boilers will drain into the oily water sewer. This sewer will gravitate into a sump tank TK-1251. From the sump tank the oily water will be pumped to Oxochem Waste Water Retention Tank TK-1280.

The initial rain water that falls in paved areas will get contaminated with previous spills. This contaminated rain water will gravitate thru the storm sewer into a sump tank. The sump tank will hold approximately 10 minutes of rainfall. After this time paved areas will be washed out of contaminants and the rain water can flow into the Tallaboa River. From the sump the rain water will be transferred to the Waste Water Retention Tank TK-1280.

In the Waste Water Retention Tank the oil will separate from the water. The oil will be skimmed and gravitated into an oil tank TK-1281. From this tank the oil will be either transferred to Corco or returned to TK-1107 from which it will be routed to the boilers light fuel oil tank.

The water from the Waste Water Retention Tank TK-1280 will be pumped to Corco's Central Collection Tank. From this tank the contaminated streams will be disposed at the high seas outside the territorial waters of Puerto Rico.

### 8.3 Why it is important

Waste or contaminated streams cannot be dumped in the rivers or coastal waters of Puerto Rico. If it is dumped in the coastal waters, it will endanger the marine life and will pollute our shores.

Laws in Puerto Rico regulates the disposal of waste streams and set strict specifications for the waters that can be disposed in the coastal waters.

In the manufacturing process of our plant contaminated streams are produced. The Waste Disposal System provides the means of disposing of the contaminated streams in compliance with Anti-Pollution Laws in Puerto Rico. Without this system the plant cannot run for a prolonged period and will have to be shutdown.

8.4 What it consists of

The Waste Disposal System consists of the following equipment:

1. An oily water sewer
2. An oily water Drain Sump, TK-1251
3. One Drain Sump Pump, P-1251
4. One Butyrate Waste Scrubber, V-1235
5. Two Treated Butyrate Waste Pumps, P-1236 A & B
6. A storm sewer
7. A storm water Drain Sump
8. One Waste Water Pump, P-1282
9. Two Storm Water Pumps, P-1280 A & B
10. One Waste Water Retention Tank, TK-1280
11. One Waste Oil Skimmer, SK-1280
12. One Skimmed Oil Tank, TK-1281
13. One Skimmed Oil Pump, P-1283
14. Two Waste Water Disposal Pumps, P-1281 A & B
15. Controls

### 8.5 How do we tell if the system is doing what it is supposed to do

The purpose of the system is to dispose of the contaminated liquid streams without polluting the environment. The system is doing what it is supposed to do if we are not polluting the environment. That is, if all the contaminated streams are collected and transferred to Corco's Central Collection Tank. If all the contaminated streams are collected there should be no effluent going to the river during normal operation. The storm sewer effluent will go to the river only after about 10 minutes of heavy rain.

The following normality data will help you determine if the system is doing what it is supposed to do:

1. Excess water from Carbon Recovery System. . . . .	14	$\pm$	3 GPM
2. Butyrate waste stream . . . . .	55	$\pm$	5 GPM
3. Spent Caustic . . . . .	2	$\pm$	0.5 GPM
4. Oily Water. . . . .	10	$\pm$	5 GPM
5. Excess Condensate from 400 section. . . . .	2	$\pm$	0.5 GPM
6. Boilers blowdown. . . . .	20	$\pm$	2 GPM
7. Storm Water . . . . .	0		
8. Oily water drain sump level . . . . .	Low		
9. Butyrate Wastes Scrubber level. . . . .	50	$\pm$	5%
10. Storm water drain sump level. . . . .	Low		
11. Waste Water Retention Tank level. . . . .	5	$\pm$	2%
12. Skimmed Oil Tank level. . . . .	Low		
13. Storm water effluent to the river . . . . .	0		

8.6 What does the operator do if the system is not doing what it is supposed to do

The Waste Disposal System has been design in a manner that it will required little attention. The waste streams that flows to both sump tanks, flow by gravity. Both sump tanks are provided with transfer pumps. These pumps are equipped with high level automatic start and low level automatic stop. In case of high level in the sump tanks and the pumps have not started the automatic start up switch should be checked. Water discharging from the storm sewer to the river is an indication of a high level in the storm sewer drain sump. This should be investigated and corrected immediately.

The Waste Retention Tank level should be kept low during normal operation. High level in this tank will shut down the storm water pumps in the sump and will let water into the river. In case of a high level a transfer should be made to Corco's Central Collection Tank. The waste water disposal pumps to transfer to Corco are started manually. These pumps will shut down on a low level signal if not the operator should shut them and have the instrumentation checked.

The oil which gravitates from the skimmer into the skimmed oil tank will be transferred manually to the fuel oil tank or to Corco. This operation is done manually. The operator should checked the skimmed oil tank periodically. This tank does not have level indication and it can overflow back to the drain sump. This should be avoided by periodic checks and transfers.

## 9.0 Summary

In this module we have covered the collection of contaminated liquid streams produced in the plant and the way in which to dispose of these streams without contaminating the coastal waters or rivers.

We discussed the source of the different contaminants and the importance of disposing of them to comply with pollution regulations applicable to Puerto Rico.

We also recover some oil from the contaminated streams that is further used as fuel.



## 10.0 Feed Back

1. Draw a block diagram showing the inputs and outputs of this system.
2. Where does the excess water from the Carbon Recovery Unit go?
3. What is the purpose of the Waste Water Retention Tank, TK-1280?
4. How are the contaminated streams disposed of from Corco's Central Collection Tank?
5. What will cause a high level in the Waste Water Retention Tank?
6. Where is the oil from the skimmed oil tank transferred to?
7. What is the capacity of the storm sewer after a heavy rainfall.
8. How do the waste streams flow to the sump tanks.
9. How is the waste water from the sump tanks disposed of?
10. Where is this waste water transferred to?

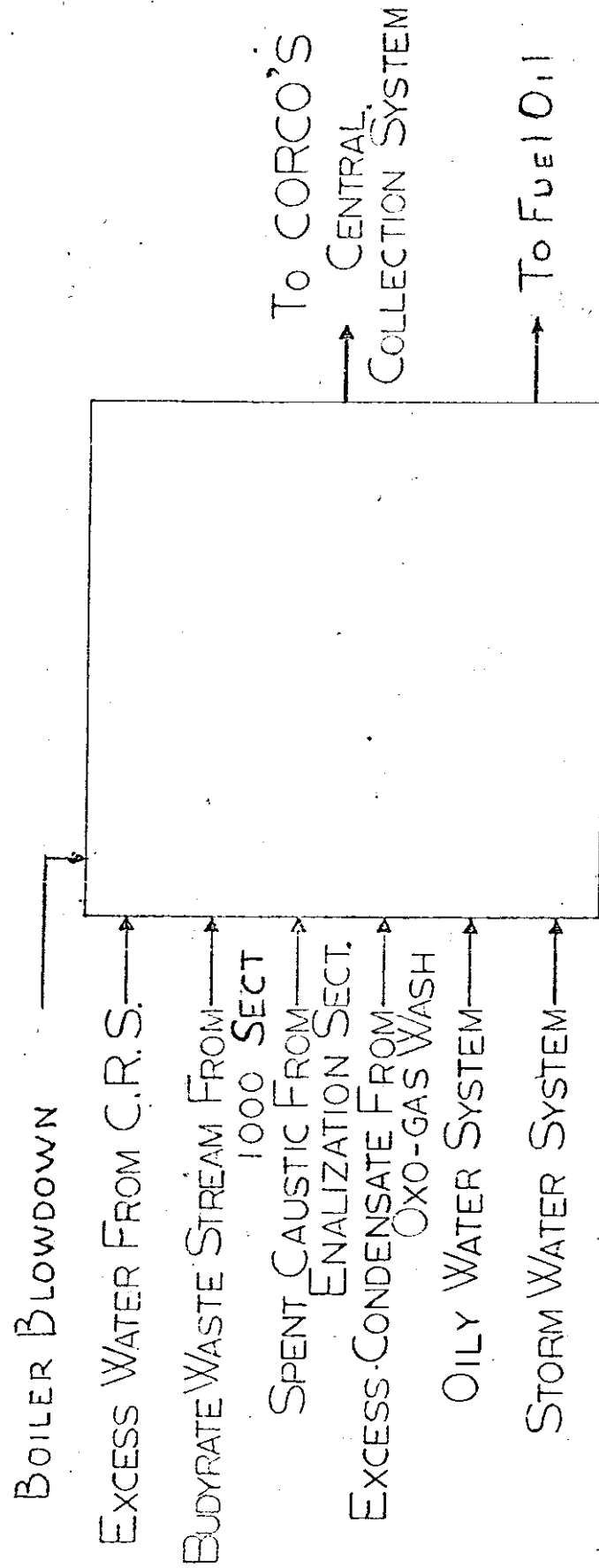


FIG-33-1 WASTE DISPOSAL SYSTEM

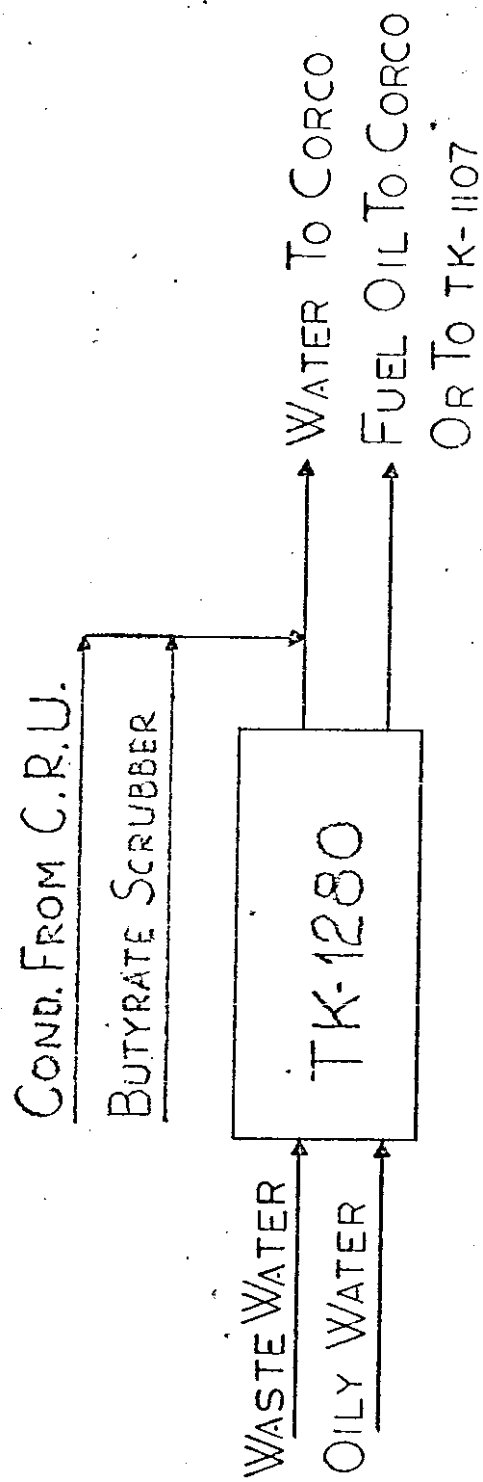


FIG-33-2

WASTE DISPOSAL SYSTEM

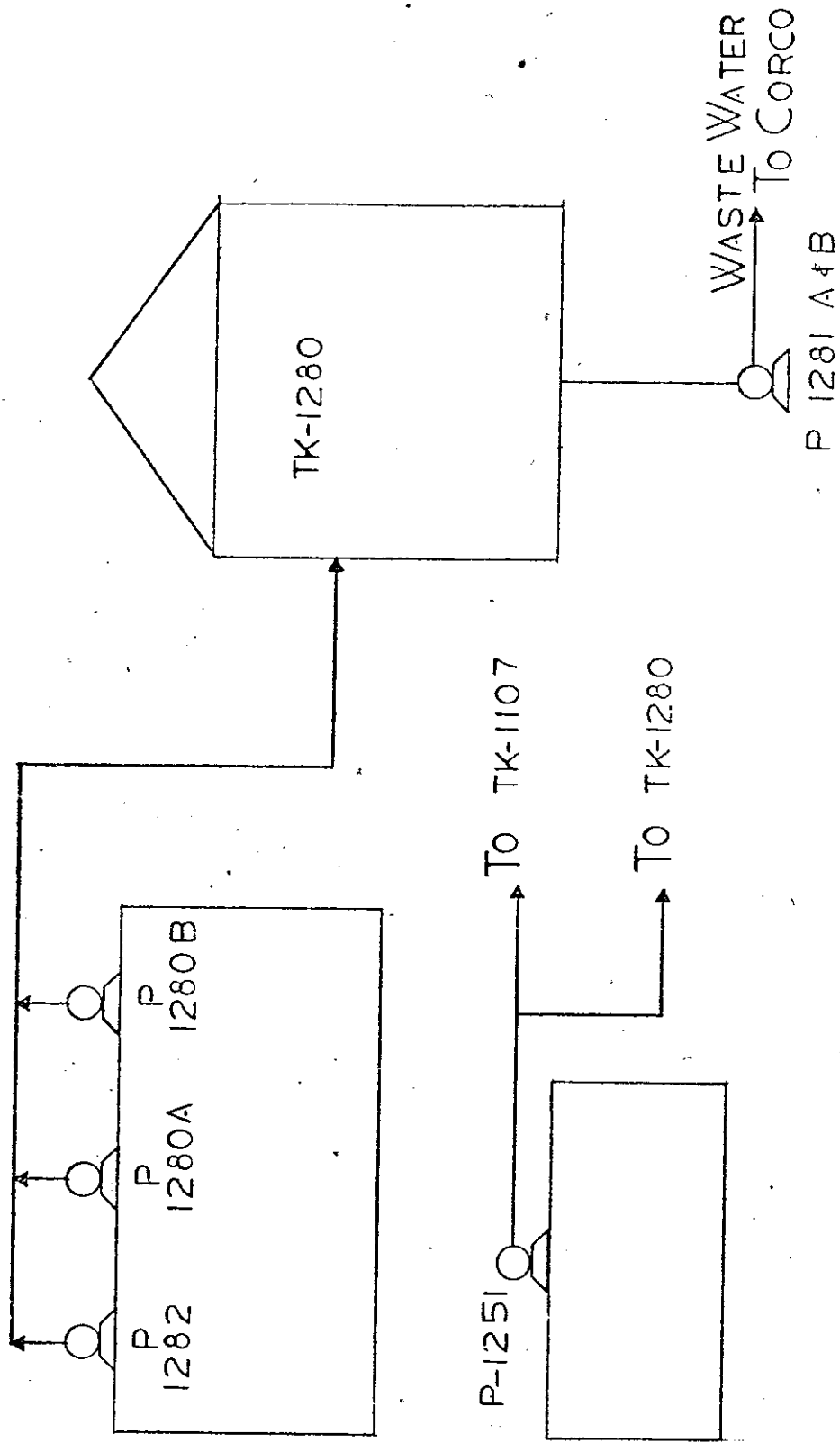


FIG 33-3 WASTE DISPOSAL SYSTEM

MOD. 33

WASTE WATER DISPOSAL

Module 33

QUIZ

1. Name the streams going to the butyrate waste scrubber V-1235 ?
2. How many sumps do we have in the waste water disposal ?
3. State how the three pumps in the storm sump work ?  
P-1282, P-1280 A & B.
4. What is the capacity of the storm water tank 1280 (gallons, or hours).
5. State how the two pumps in the waste water tank 1280 work.
6. Where does the oil collected in TK-1281 go ?
7. How do we separate the oil from the water in TK-1280 ?
8. State all the streams that we have in the waste water disposal.
9. Where do we send the oily water from sump 1251 and the waste water from TK-1280 ?